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ABSTRACT

Some States (notably New York, Pennsylvania, and Oregon) collect information which provides evidence or indicators that their school programs are doing what they are intended to do. For example, finding out how many college preparatory students are still in college and how many vocational students are gainfully employed in the vocation for which they prepared one year after high school graduation. Educational indicators are gathered either from questionnaires sent to parents and students, or evolved from information already being collected at district, county, State, or federal levels. Indicators can greatly assist local school administrators, as well as the lay public, by allowing them to view the existing educational program in a perspective different from the traditional one. The purpose of this monograph is to present a rationale for the use of educational indicators as significant components in the evaluation of school programs. (Author/JF)

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USING EDUCATIONAL INDICATORS

FOR

PROGRAM ACCOUNTABILITY

by

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FOREWORD

The use of indicators has proved invaluable in the business sector for many years. Likewise, social indicators have been utilized widely to assist in the determination of future needs relative to varied aspects of American life.

Now indicators of performance have entered the field of education. The State Department of Education in Oregon has been a leader in the gathering and application of educational indicators. The department's publication, *Indicators and Statewide Assessment*, published by the Cooperative Accountability Project (CAP), is a valuable addition to the rapidly growing collection of assessment and accountability literature. CAP also will publish another indicator-related document based on the work of Thomas E. Kendig and J. Robert Coldiron in the Pennsylvania Department of Education. They are examining the indicators identified by Oregon and establishing relationships to specific educational condition variables which have been collected in Pennsylvania.

Additionally CAP asked Michael J. Grady, Jr. to prepare this monograph as a guide to the use of indicators by school district personnel who are concerned with evaluating the effectiveness of their school programs. Dr. Grady has given full consideration to the Oregon publication noted above and to the work that is being done in Pennsylvania preparatory to that state's publication. His intent is to build a bridge, as it were, between the two documents and to provide specific guidelines for the application of indicators at the local school district level.

It should be noted that state departments of education across the country have been the intermediaries between legislators and state boards of education on the one hand and local school districts on the other. For the past several years state department personnel have been talking about new responsibilities in assisting school districts with their educational accountability efforts, but the progress in this direction has been slow. Perhaps this is because too few people were giving serious thought to appropriate evaluation procedures at either the local or state levels before the accountability movement appeared on the scene. Since the basic responsibility for education in this country rests with each state, it is important to recognize that state departments of education are in a favorable position to provide the needed leadership and assistance to improve evaluation processes throughout their jurisdictions.

While school districts long have been expected to be accountable for the implementation of educational laws and state school board regulations concerning such matters as transportation, requirements for school facilities, lunch programs, and so forth, they now are being asked to be accountable for the *performance of their students.* Educators widely recognize that the traditional written test--by itself --cannot provide a true and complete evaluation of student outcomes. Now the introduction of indicators to the educational field may help to give greater impetus to broad evaluation efforts so necessary at both state and local levels.

With the increasing commitment of student time, school personnel, and public money to the educational enterprise, many questions continue to be raised about school system operation. Since quality education has become a public byword and educational accountability is being stressed on all fronts--local, state, and national--the question is being asked, "Do educators have specific evidence upon which the quality of the educational program can be judged?" This monograph on *Using Educational Indicators for Program Accountability* will help to provide procedures for answering that question. Providing evidence is the responsibility of local, state, and national agencies. Judgment based on the evidence rests with the various publics concerned with education. Each must make sound decisions within its area of responsibility. These publics include legislators, taxpayers, students, local school administrators, and members of state departments of education. Accountability will work if each of these publics accepts its responsibility for decision making based on the evidence in the form of indicators of performance.

I sincerely hope this monograph will assist educators--as well as legislators and concerned laymen--in the search for readily available and relatively inexpensive indicators of performance upon which decisions can be made concerning the effectiveness of educational programs.

Arthur R. Olson, Director
Cooperative Accountability Project

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CHAPTER I

INTRODUCTION

Traditionally one of the unique features of American public education has been the meaningful involvement of local citizenry in providing support for the financing, administration, and guidance of educational programs. Actual teaching and corresponding educational learning procedures are assigned to professional educators and supportive personnel employed by a given school district. Citizens provide the resources necessary to implement the educational programs which they have authorized through their representatives on the school board. Ideally educators then complete the cycle by supplying citizens with information intended to show how much students have attained as a result of the community's concerted efforts.

Educators' reports to local citizens concerning student learning progress have tended to focus on achievement test information. Generalizations designed to reassure the local public have included statements such as: "Our students rank in the top 70% of students nationally in mathematics"; "Our high school students have achieved in the top 10% of all students in our state in social studies"; or "Our elementary students scored at the national average on reading speed and comprehension."

Such educator assurances usually were acceptable to local citizens until the mid-1950s. But when the Russians successfully fired their Sputnik, many Americans began asking, "Why wasn't America first in space?" One prominent response at the national level was that U.S. public education did not include sufficient mathematics or science to allow American learners to be on a parity with their Russian counterparts. This rationalization was seized upon by Admiral H. G. Rickover who claimed that high school graduates were not capable of learning to perform work on nuclear submarines without considerable additional training. Educational leaders across the country took issue with Admiral Rickover's thesis, and the national educational debate began. Educators voiced the argument that American public education was basically sound but, with additional educational counselors and financial

resources, it could be even better. Legislation quickly passed to provide federal funds for counselor training, audio-visual equipment, and improving existing mathematics and science courses. In 1965 these programs were enlarged through the passage of the Elementary and Secondary Education Act which made funds available for a wide variety of special learners, innovative educational practices, and the strengthening of educational leadership in each state.

The American public readily accepted federal supplemental funding of local educational programs. It had much to recommend it. Students gained additional educational opportunities which did not have to be financed with local tax resources. Local educators continued their usual means of reporting student achievement information to the public, and the public seemed satisfied.

But by the early 1970s economic and social upheavals and corresponding increases in taxes began to affect every aspect of American life. Now people started to ask, "What are we getting for all the money we're putting into education?" State legislators reacted quickly to this public concern and at this writing, over half of the 50 states have passed legislation on *educational accountability*.

The nature of each state's educational accountability statutes varies from the mere reporting of achievement testing, pupil-teacher ratios, and dropout information to more extensive reporting by school districts including program cost information. Throughout educational accountability legislation, however, is the common concept which requires both *responsibility* and *disclosure*.

Someone--or, more likely, many people--are responsible for the amount of learning each student attains. Certainly teachers, counselors, and educational administrators influence achievement. Students themselves have a responsibility for their own learning. Parents also play an active role in terms of their youngsters' learning. In addition leaders in business, commerce, industry, labor, and the trades, as well as the public at large, should be very concerned about the instructional process. They not only pay for the educational opportunities in their community, but also employ the products of public education.

Now as we proceed through the 1970s, it no longer will be considered sufficient for educational accountability disclosure purposes to seek and report information concerning

expenditure per student, quantity of equipment and material resources, quality of human resources, student achievement on a school, state, regional, or national basis, or the percentage of graduates who enter college. Such data still are considered necessary, but it will not be sufficient for educational accountability purposes.

The following questions, although not exhaustive, provide an indication of the nature of additional information which may be required in the future if a school district is to be truly accountable to the public it serves:

(The sample questions are directed to a sixth grade math program.)

1. How much do the math materials cost in the Grade 6 program?

2. Cost/student (Cost per student)

3. How much pupil achievement is attained for this cost?

4. Are alternative commercially available math materials more cost effective?

5. What is the anticipated usable life for the present math materials?

6. What is the anticipated usable life for alternative math materials?

7. Are alternative math materials available for gifted and slow learners as well as for the average student? Or are present materials comprehensive enough so these various student learning needs can be satisfied?

8. Is the math curriculum for Grade 6 students relevant to their learning needs?

9. Are the Grade 6 math materials racially biased? Do all ethnic youngsters achieve equally well with these materials? If not, what procedures have been employed to equalize the math educational opportunities for all students?

10. Are the illustrations and problems to be mastered by the student practical in terms of real life or

career education applications of math theory, or are they theoretically oriented for the more academically talented or college-bound students?

11. What percentage of students is functioning at or above grade level in Grade 6 math?

12. Are there certain minimum competencies in Grade 6 math that are required of all students? Which ones? How many? How is mastery learning of these competencies achieved?

13. Which Grade 6 math skills are most difficult for students to master? What has been done to lessen this problem?

14. Are the district schools overcrowded? If so, what has been done to accommodate the overflow? Split sessions? Extended day? Modular scheduling? What impact has overcrowding had upon the student learning of Grade 6 math? What has been done about this problem?

These questions (#1 - 14) could be applied to grades one through six programs in language arts, reading, or social studies. They also could be applied to grades seven through twelve English, social studies, science, physical education, and vocational education programs.

The educational accountability process also may require the examination of additional questions of a more general nature, such as the following:

1. What is the dropout rate? Are dropouts proportionate to the ethnic enrollment of all students in the district? If not, what has been done about it?

2. How does the cost per student vary from the elementary, junior high (or middle school), and high school levels? Is this variance reasonable?

3. What is the counselor-student ratio at the high school level? At the junior high (or middle school) level? Are counselors operating in the elementary schools?

4. Are counselors actually spending their time counseling students, or are they functioning as highly paid secretaries who deal only with student scheduling?

5. Are comprehensive vocational courses available for all grades at the secondary level? If not, why not?

6. Are teachers certificated, and do they have a collegiate background for all courses they teach? Are teacher salaries on a parity with similarly sized school districts in the state?

7. Do teachers, students, and citizens have an input into the specifications of the various curricula offered in the district?

8. Does the district share its accountability findings with neighboring districts? If not, why not?

9. Has the school district entered into cooperative research studies with other districts? If not, why should the district be duplicating expenditure of research funds being spent elsewhere in the state?

10. Do the administrators suggest alternative educational programs to replace those which are not presently cost effective in terms of locally available funds?

Undoubtedly a few years will pass before many school districts can provide answers to the first group of fourteen sample questions on both grade and academic levels. Those questions dealing with costs probably will not be answerable until experimental studies on educational Program Planning-Budgeting-Evaluation Systems (PPBES) are completed, and workable procedures are available to ascertain needed cost data. Many answers relevant to the second set of ten questions, however, already are available at the local school district level. Granted, some time will be needed for districts to "tool up" to gather this information. The gathering process will necessarily involve the skillful use of educational indicators.

Indicators

Virtually every American adult uses indicators to assist in making decisions relative to purchasing a home (prime interest rate for mortgage money), buying stocks (Dow-Jones averages), judging the purchasing power of take-home pay (consumer price index), etc. Likewise, some states (notably New York, Pennsylvania, and Oregon) collect information which provides evidence or *indicators* that their school

programs are doing what they are intended to do. For example, finding out how many college prep students are still in college one year after high school graduation and how many vocational students are gainfully employed one year after high school graduation in the vocation for which they prepared could go a long way to help answer the question, "How well do our college prep and vocational education programs prepare students for college and the world of work?" For both groups in the illustration, the local school district would have to develop a specific study to gather needed information. In all likelihood telephone interviews with parents or a questionnaire sent to graduates would have to be completed and the findings tabulated and evaluated.

Other educational indicators might evolve from information already being collected either at the district, county, state, or federal levels. Essentially, these indicators would cost nothing to obtain.

Indicators can greatly assist local school administrators--and the lay public--by allowing the existing educational program to be viewed in a different perspective from the traditional perspective. Indicators also can be employed to support the quality notion which an educational program had, has, or should have.

The purpose of this monograph is to present a rationale for the use of educational indicators as significant components in the evaluation of school programs. As the reader will discover, indicators are not new; rather, it is suggested that the use of indicators by educators enables them to better evaluate the effectiveness of their programs.

Generally school administrators will have four purposes in using educational indicators. These purposes can perhaps be best summarized in the following questions:

1. How are our students doing in school?

2. How do our students fare after they leave school?

3. How can this information be of assistance to our instructional staff?

4. Are we getting as much as we should for our school dollar?

These are four rather basic questions which trigger myriad sub-questions when related to a given educational

program. For example, let's say that we want to focus on the sequence of commercial (business) courses being offered in our school. We could expand our basic questions something like this:

1. How are our students doing in school? Consider

   - grades assigned

   - commercial student morale

   - teacher-classroom observation

2. How do our students fare after they leave school?

   - check with businessmen who have hired our graduates

   - note strengths as well as weak areas in our academic experience as related to whether or not commercial students are "making it" on the job

   - send questionnaires asking value of high school commercial courses for students enrolled in colleges or vocational schools

3. How can this information be of assistance to our instructional staff?

   - appraise the staff of the information (indicator data) obtained from questions #1 and #2

   - the effectiveness of our business program in terms of graduate success on the job would tend to reinforce the key skill areas of our commercial course sequence

   - the weak areas identified would become areas for consideration of possible course revision

4. Are we getting as much as we should for our school dollar? Let's say we have a four-course sequence in our commercial program. We should look at

   - cost per student for each of the four courses as well as the total cost of the program

   - the problem areas discovered under question #2 to see if some older, traditional material might be dropped in favor of including the problem area topics

- various cost comparisons from course to course to see if we could teach the skills required for the modern student in three or three and one-half courses instead of four...or if we really need four and one-half or five full courses in our commercial sequence

When used in the manner just described, educational indicators can be of invaluable assistance to administrators, teachers, school board members, and the public in helping our educational programs remain relevant, up-to-date, and cost effective for local purposes.

The remainder of this monograph is devoted to an elaboration of the use of educational indicators either for accountability purposes or for planning and efficient management. In Chapter II, indicators are defined more precisely, and the various kinds of indicators are described and illustrated. Chapter III is designed to answer the question, "Where do you get indicators?" Chapter IV tells you how to collate indicator data for analysis. Chapter V suggests alternate ways for interpreting indicator data. Finally, Chapter VI presents suggestions concerning the dissemination of indicator data. Throughout, the approach is one of "how-to-do-it" rather than the creation of a theoretical treatise on educational indicators.

CHAPTER II

EDUCATIONAL INDICATORS DEFINED AND CLASSIFIED

What is an Indicator?

Webster's Collegiate Dictionary defines an *indicator* as "*one that shows or points out; an indication or sign.*" This same definition also serves as a global description of *educational indicators.* In other words, educational indicators should show or point out instances where our educational programs are doing what they were designed to do. Also, educational indicators should provide an indication or a sign that the quality which was built into the educational program actually is there. An additional point must be emphasized: *All educational indicators are quantifiable; that is, they are described by some numerical value.*

The numeric quantity obtained for an indicator must be assigned some meaning and then be compared against some acceptable standard. For example, a *pupil-teacher ratio* of 25:1 usually is considered to be educationally more desirable than one of 30:1. The lower ratio tends to indicate that each student could receive more personal assistance from the teacher. An indicator which might suggest the *availability of economic resources* for a given school district would be better if a higher rather than a lower numerical value is obtained. Similarly, high scores would be desirable for the indicator *student test results*, while low scores would be preferable for the indicator *incidence of drug abuse by young adults.*

The crucial point to keep in mind is that when you decide to employ an educational indicator, you should define for yourself the magnitude which represents acceptable achievement BEFORE you can make any judgment about your actual indicator findings.

The Oregon Department of Education has defined an indicator as "a descriptor in quantifiable terms, of the status at a specified point in time of a significant

condition or variable which provides evidence useful for an analysis of progress toward a goal or objective."[1] Note the Oregon definition is both precise and comprehensive. Oregon also identifies the three important elements that appear in the definition:

1. The expression is *quantifiable*--data does exist or can be collected to show "how much" of the indicator exists.

2. The *condition or variable* that is described has, by general agreement, a relationship to the goal with which it is associated.

3. The measurement is associated with a *point in time* (Ibid., p. 3).

Oregon illustrates an indicator that contains these three elements with this example:

> The number of high school seniors (1) who did volunteer work in a community social agency (2) during the school year (3) (Ibid., p. 3)

(Such an indicator probably would be used in support of an objective in a senior social studies course.)

Whether the reader prefers the dictionary or the Oregon approach to defining indicators, the same result will ensue. Indicators will help you evaluate the various educational programs in your school. Once you have settled on a definition of educational indicators, you need to know the kinds of indicators which may be available to you.

Classification of Educational Indicators

Educational indicators can be obtained from a wide variety of sources depending upon your purpose in using them. Functionally, indicators can be classified as:

Administrative--including population and census data, finances, sources of revenue, etc.

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[1]Robert Clemmer, Dwight Fairbanks, Mary Hall, James Impara, and Charles Nelson, *Indicators and Statewide Assessment* (Denver: Cooperative Accountability Project, 1974), p. 3. Subsequent quotations from this source are cited in parentheses following each quotation.

School Program--including pupil-teacher ratio, student intelligence and achievement information, dropout rate, success after graduation, etc.

Planning--including population trends, impaction of minorities, availability of local economic resources, etc.

Each school district probably will wish to design a classification system which best fits its organizational structure. States employing educational indicators have chosen differing patterns for classifying them. Several examples are summarized in the following paragraphs.

OREGON

Oregon has classified educational indicators according to their uses under four major categories: (1) *input*, (2) *context*, (3) *performance*, and (4) *societal*.

1. An *input indicator* describes a condition or variable over which the school has some control and which affects the school's ability to achieve an instructional, management, or support goal. (Ibid., p. 3)

Input indicators tend to be concerned with the basic "raw material" of the learning process. Examples include number and sex of students; number, sex, and educational background of teachers; pupil-teacher ratio; quantity of facilities or equipment; quality of facilities or equipment; number of teacher aides and support personnel; number of counselors and administrative personnel; etc.

Let's see how you might use an input indicator as part of the educational decision-making process. We'll say, for the sake of example, that your pupil-teacher ratio is 32:1 in elementary school A. For the past three years grade 3 students at school A have been achieving four months lower than equivalent students at school B which has a pupil-teacher ratio of 24:1. In all likelihood you would use this input indicator data as justification for providing additional teachers and facilities at school A to lower the pupil-teacher ratio to around 25:1.

Another use of input indicators might involve an overcrowding problem. Let's say that one section of your city is rapidly expanding in terms of new home construction. You

have an existing school in that particular area built to accommodate 1,200 elementary youngsters. Presently you have 1,400 students enrolled in the school, and city planning projections estimate that two years from now, 2,800 students will be living in the area in question. Other schools in the district are functioning at 110% student capacity. What do you do? First, the school board may float a bond to build a new school which will accommodate 2,000 students in the overcrowded area of the city. But since the new school cannot be operational for two years or more, obviously educational administrators and planners will have to devise some stopgap enrollment pattern for the existing school until the new one can be occupied. Some alternative such as split sessions, extended day, or year-round schooling will need to be employed. Also, more administrators, teachers, aides, and support personnel will need to be hired.

> 2. A *context indicator* describes a condition or variable over which the school has little or no control. It affects the school's ability to achieve an instructional, management, or support goal. (Ibid., p. 3)

Context indicators describe the learning environment for a given school or school district. The key thing to keep in mind when dealing with context indicators is that they tend to be "givens" you just have to live with. Examples of context indicators include socioeconomic background of students; ethnic background of students; ability of students; availability of economic resources; operating costs by budget category, grades K-12; average daily membership; operating costs per resident average daily membership; number of recipients for free and reduced school lunch program; number of children in families below the poverty level; etc.

While, for the most part, context indicators cannot be changed, they often provide sufficient justification for a school or school district to qualify for additional funds under various state and federal categorical programs. School districts in close proximity to large Department of Defense installations, for example, qualify for Public Law 874 funds. Similarly, school districts having a high incidence of minority children qualify for federal funds under Title I of the Elementary and Secondary Education Act. Many states also have funds available for the special education child. If a district has a number of youngsters who qualify for special education programs, it can apply for and receive state financial assistance.

For any given school district, one mill of taxes will yield only a given sum of tax dollars. This sum usually is large for urban centers; smaller for suburban "bedroom communities"; and smallest for rural communities. The taxes per mill indicator is a crucial ingredient for state legislation for the support of public education when a "power equalization" formula is employed. So, while you can't do too much about changing context indicators, you certainly can use these indicators prudently to secure additional funds for your schools.

3. A *performance indicator* describes a measurable or observable behavior or variable used to determine program effectiveness or efficiency. Data may concern: (a) student performance scores, or (b) a program variable such as instructional process or availability of learning experiences. (Ibid., p. 3)

Performance indicators will be the most frequently used indicators of success of educational programs. Examples include student test results; anecdotal records of student behavior; number of students completing graduation requirements; number of courses using individualized instruction; number of courses offered; number of students who enroll in two- or four-year institutions upon graduation; number of learning situations outside of the school that are available to students; number and ethnic background of dropouts; number of students enrolled in vocational education courses; number of young adults (ages 18-21) who register and do vote in local elections; number of graduates who are working in the occupation they trained for one, three, and five years after high school graduation; percentage of high school graduates who continued their education in state institutions; etc.

Based upon the goals and objectives of a school district's educational program, a series of performance indicators could be assigned to key objectives. The performance indicators then would provide additional information to student test results to determine the degree to which students are achieving the desired outcomes of learning. Performance indicators not only can measure the cognitive skills usually associated with academic learning, but they also can measure the affect or attitudes which students have about the learning process.

Follow-up studies on graduates might tend to show that some required courses are rated as having "no value" after

graduation. Armed with this information, administrators and school board officials may consider giving the required course or courses in question more practical utility or, if this is not feasible, the course(s) might be dropped from the "required" list.

Test results also might show that junior high school students are below the state or national average in social studies, for example. The teaching staff then can determine whether the social studies questions on the test represented a sample of the objectives of the junior high social studies program. If the test does reflect the objectives of the social studies program, then the program may need to be strengthened in certain content areas. If the test does not reflect the objectives of the social studies program, then another test which does should be administered before any decision is made concerning possible change of course content. Thus performance indicators can provide continuous information concerning change in the educational programs of a school district.

4. A *societal indicator* describes a measurable aspect of a social condition affected to some degree by education. (Ibid., p. 3)

Societal indicators provide some inkling of the value which schools have fostered or failed to foster in their students. Examples include the number of arrests for delinquency; suicide rate for young adults; incidence of drug abuse by young adults; incidence of alcoholism by young adults; employment rate of recent graduates; number of juvenile, school case, misdemeanor problems handled by school district; marriage rate of graduates; divorce rate of graduates; incidence of venereal disease by young adults; number of illegitimate births; number of persons 65 years of age and over in the district population; number of welfare recipients among young adults, etc.

For the sake of illustration, suppose the number of young adult arrests for alcoholism has been on the increase in your school for the last three years. Let's also say that your school district's alcohol and drug abuse portion of a required high school health course has been operational for the last seven years. The indicator of increased alcoholism tends to suggest that the instructional strategy or methodology employed could be improved. If the rate of alcoholism continues to increase, perhaps a more realistic and positive approach could be stressed in your high school health course.

Take another example of a societal indicator. Let's say that the number of persons 65 years of age and over in your school district has stabilized. A query of the senior citizens reveals their interest in enrolling in arts and crafts courses as part of the school district's community school program. For those districts in which fiscal policy allows all the public to benefit, teachers could be hired and the school building made available for senior citizens' arts and crafts courses. For those districts where policy precludes financing courses for senior citizens, perhaps one of the senior citizens could serve as an arts and crafts teacher, and the district could make a school building available for the senior citizens' class during after-school hours when custodians normally would be working.

In summarizing the Oregon classification of educational indicators, it is apparent the classification is both comprehensive and precise. In their suggestions for using indicators, Oregon educators suggest that indicators should be (1) related to agreed upon goals; (2) derived from reliable and valid data; (3) derived from data that will continue to be collected so that comparisons over time may be made; and (4) derived from data for which the measurement techniques have stability over time. (Ibid., p. 3)

NEW YORK

In New York the State Education Department has developed a Performance Indicators in Education (PIE) program for local school districts to use in evaluating their educational programs. The classification of educational indicators under the PIE program is as follows:

1. *Input factors* (student characteristics at the start of the evaluation) (Ibid., p. 12) Similar to the student portion of Oregon's input indicators.

2. *Process factors* (Ibid., p. 12) Characteristics of the educational program, especially the methodology employed to achieve student learning.

3. *Output factors* (student characteristics at the conclusion of the evaluation) (Ibid., p. 12) Similar to the performance indicators under the Oregon classification.

4. *Surrounding conditions* (community characteristics) (Ibid., p. 12) Similar to the context indicators under the Oregon classification.

The New York classification is an interesting one for at least two reasons. First, the focus is on evaluation. The classification lends itself to the classical research design usually found in educational research. Subjects are selected for the study (*input indicators*). Some methodological procedures are employed in the study (*process indicators*). Results are gathered and analyzed (*output indicators*). The results are interpreted within the constraints over which the experimenter has little or no control (*surrounding conditions indicators*). As the reader will understand more fully later, the New York emphasis on evaluation represents greater potential for positive change than does Oregon's approach which is designed to be carried out at the measurement (or assessment) level.

Second, the PIE program is designed so each school district may develop its own indicator profile which can be compared with the profiles of other school districts having similar community characteristics. This analysis provides local educational decision makers with a series of profile comparisons which may assist them in the selection of the alternative decision which holds the most promise for success in their district.

The New York State Education Department administrators of the PIE program describe its purpose as follows: "*To estimate the difference between (a) the level of output which could be expected if the schools' contribution to output were not significant, and (b) the actual level of the schools' output. The difference between the two values is taken as an indicator of the schools' performance.*" (Ibid., p. 12)

What this statement really says is that a school district can predict the expected performance students in each school can attain. PIE administrators do this by using statistical equations which assign different weights to socioeconomic status, student ability, sex (girls usually achieve more than boys at the lower grade levels), etc. for each child in each school; this refers to part (a) of the quoted statement of purpose. The actual level of each student's performance is compared with the performance level that was predicted for the child. These "difference values" then are tabulated for each grade in each school. When the actual values for the school as a whole exceed the predicted values, this is taken as an indicator that the school has positively influenced its learners, and vice versa; here is reference to the part (b) of the quoted purpose.

PENNSYLVANIA

The Pennsylvania use of indicators is an extension of the statewide assessment program which has been going on in that state for the past three or four years. In fact, the already described Oregon classification is an extension of what has been accomplished in Pennsylvania. Heretofore, Pennsylvania has chosen to use the expressions *conditions* or *variables* in lieu of the expression *educational indicators*. Each condition or variable is used either singly or in combination to predict student performance. More than 50 variables have been classified into the following three categories:

1. *Characteristics of students.* (Ibid., p. 12) (These overlap into the input, context, and performance indicators in the Oregon classification.)

2. *Characteristics of teachers.* (Ibid., p. 12) (These are the same as Oregon's input indicators as related to teachers.)

3. *School and community characteristics.* (Ibid., p. 12) (These are the same as input and context indicators in the Oregon classification.)

The purpose of the Pennsylvania educators is to determine the exact relevance of each of these conditions to student performance in relation to each of ten educational or life goals. For example, five conditions have been singled out to predict performance of fifth grade students in relation to the goal of *achieving self-understanding*. These conditions are "father's occupation; housing conditions in the community; teacher stability; teacher experience; and school subsidy per student." (Ibid., p. 12) It can easily be seen that Pennsylvania, through its use of conditions or variables, is trying to find what range of factors influence the academic and attitudinal performance of its students.

Since it is one of the participating states in the Cooperative Accountability Project, Pennsylvania is preparing materials (which will be published by CAP) emphasizing the state's educational quality assessment findings and discussing these (indicators) as they relate to goals of education in Pennsylvania. When these findings are available, it would be reasonable to assume that the correlates of educational performance uncovered will have general application for school districts across the nation.

Summary

The purpose of this chapter has been to present a series of alternative ways for classifying educational indicators. Each reader will need to choose the system or combination of classification systems to employ at a particular local school level. The dictionary or functional approach, when used with the four purpose questions described in Chapter I, can provide a rather simplistic way for using indicators in the evaluation of educational programs. The Oregon classification is quite comprehensive and rigorous. It also introduces the notion of elevating societal factors to the same status of input, context, and performance educational indicators. The New York classification follows the classical experimental design usually found in educational research. To think that one can use educational indicators without conducting some form of study or research is to be kidding oneself. The New York approach should provide local educators with insights concerning how to use and follow up on indicators from year to year. The Pennsylvania approach to educational indicators provides a concentrated approach to handling performance indicators. The statistical precision employed in the Pennsylvania approach should provide local district educators with an "already validated" means for dealing with educational indicator data. The composite perspective of these three state classificatory systems will give each local educator an opportunity to put his school district's policy for handling educational indicators in a more comprehensive framework.

Now that the reader knows what educational indicators are and how they can be classified, we're ready to find out how to obtain the educational indicators you may wish to use.

CHAPTER III

WHERE DO YOU FIND EDUCATIONAL INDICATORS?

Assigning Responsibility

When a local school district decides it wishes to use educational indicator information as part of the process of evaluating its educational programs, it will be necessary to assign the responsibility for the work (and it *is* work) to some member of the district administrative staff. The staff member selected should possess, as a minimum, a background in testing and measurement, psychological statistics, and educational research design. Depending on local circumstances, the person should be assigned to the indicator task on a full or part-time basis.

In a large school district a testing department or a research department (or both) may already exist and can assume the responsibility for gathering and using educational indicator information.

Medium and small-sized school districts usually do not have research or testing departments, so either the head counselor or head of the mathematics department might logically be assigned the indicator responsibility. If this additional assignment would prove to be an excessive burden (and in many cases it would), then the individual's counseling or teaching schedule would need to be reduced.

After a *district coordinator for indicators* has been found at the district level, he or she may request that an indicator *contact person* be appointed for each school in the district. This contact person then could supervise the collection of indicator data at the school building level and provide input to the district coordinator for indicators.

Local school boards may wish to appoint an *advisory committee* for educational indicators composed of administrators, teachers, students, parents, and other taxpayers. The advisory committee should work with the district indicators coordinator to assure that a comprehensive mix of indicator data is made available to the school board for

decision-making purposes. Some state accountability laws require local districts to appoint an advisory committee for accountability purposes. Should this be the case in your district, by all means assign the indicator advisory responsibility to the accountability committee. If your district does not have an accountability committee, you should examine the various district "standing committees" to see if one of them can take on the educational indicators responsibility before you elect to appoint a special advisory group for educational indicators. There is a tendency in public education to overextend the number of committees advising the board of education. The suggestion for an educational indicators advisory committee is in no way a recommendation to contribute to this proliferation. Yet it should be stressed that *committee assistance*, especially in the early planning stages, can help to assure that an adequate number and variety of indicators will be collected for your analysis purposes.

Where Do You Locate Existing Indicator Data?

The question of where to begin gathering indicator data is far from superficial. Even readers who are familiar with indicators may find the question less than easy to answer because of the limited scope of their experience with educational indicators. For those readers now being introduced to indicators for the first time, the question is of obvious initial concern.

Existing indicator data are available at the following sources:

Source	Indicator Information
1. Local School or District Central Administration	1. School census; ethnic distribution in city and schools; operational school budget; total school budget; average daily attendance; grade distributions by course, grade level, and school; number of students by grade and sex; number of certified teachers; percentage of administrative and teacher turnover; results of educational research studies conducted within the district; number of special education students

Source	Indicator Information
	and programs; number of gifted students and programs (usually ignored); student test results; dropout data; parent and community needs assessment data; state and federal categorical aid programs; school lunch program, transportation routes and costs; school mill levy; and other educational planning factors.
2. City or County Government	2. Data on property and use taxes; demographic information which shows areas of population decrease, stability, or increase; welfare information; home building projections; industrial and commercial wealth of the area, along with projections for the future; employment and unemployment data; health data including the incidence of venereal disease; number of adults over 25 who do not have a high school diploma; number of people over 16 who have had no formal years of school; park and recreation data; number of work permits issued to minors; crime statistics including juvenile offenses; incidence of alcohol and drug abuse; vital statistics including births, deaths, marriages, divorces, aid to dependent children; assessed valuation data by region; and planning studies showing decreased, stable, or increased projections for the short- and long-term future.

Source	Indicator Information
3. State Government	3. Data available at the district and county level also are provided for all counties in the state. Additionally, the various agencies of state government also collect and distribute other data on request.
a) State Department of Education	a) Ethnic distribution of students; number of segregated schools; number of racial and ethnic group school district personnel; number of schools with a high concentration of low-income students; number of teacher aides and certificated teachers by position and level; operating costs by budget category, Grades 1-12, including per pupil costs; private and parochial school enrollment: grade levels, number of administrators and teachers, high school graduates; projected enrollment by grade; number of public high school graduates by age and sex; number of students enrolled in vocational education courses; number of recipients for free and reduced school lunch program; community college enrollment in vocational courses; number of school bus accidents: type, date, and time; number of counselors: percentage of assigned counseling time; number of children

Source	Indicator Information
	in public kindergartens; number of students and programs for special education; compendium of current laws related to public education.
b) Department of State	b) Number of registered voters; percentage of eligible registered voters; number voting in an election; number of eligible voters; number of businesses: established during the year, total number, bankruptcies; etc.
c) Department of Health	c) Number of cases and rates of venereal disease; number of: live births, illegitimate births, and infant deaths; number of health professionals needed in the state's communities, by profession; number of persons receiving out-patient and in-patient care in county mental health hospitals; number of hospitals, patient care facilities, and professional staff in the state; incidence of alcohol and drug abuse in the state; number of people in various health occupations; number of persons 65 years of age and over; and the total population.
d) Department of Social Services	d) Number of persons participating in abundant food and food stamp programs; number of welfare recipients; number of unemployed and underutilized disadvantaged

Source	Indicator Information
	persons averaged over 12 months; total number of children served by public and voluntary child welfare agencies and institutions; number of persons receiving general assistance aid payments; number of persons receiving aid to dependent children payments (non-medical).
e) Department of Law (Attorney General's Office)	e) Number of arrests: offense, age (under 18, 18 and over); crimes reported last year, last three years, and projection for next year; number of juvenile school case, misdemeanor problems handled; number of juvenile delinquency commitments to state institutions; number of consumer problems handled by Legal Aid: sales contracts, garnishments, wage claims, bankruptcies, other; number of family problems handled by Legal Aid: divorce and annulment, separation, non-support, custody and guardianship, paternity, adoption, other.
f) Department of Revenue	f) Data on property, use, county, city, and state taxes; number of state income tax returns filed by county and city; number of elderly persons with no taxable income or less than $3,000 of taxable income; distribution of wealth around the

Source	Indicator Information
	state; number of dollars in payrolls, by industry.
g) Department of Transportation	g) Number of young adult (under 24) drivers involved in accidents; number of schools with organized safety education programs, driver education, student accident reporting, and transportation safety programs; number of schools with adult driver education including problem driver courses, refresher courses, and special driver courses for handicapped; number of schools with programs related to alcohol involvement in traffic accidents; number of traffic violation convictions for young adults; percentage of licensed drivers under 25 and 25-34 years of age with percentage involved in all accidents, and percentage in fatal accidents; number of vehicle deaths per 100,000 miles driven; percentage of male drivers and percentage of female drivers by number of accidents and number of violations; number of driving accidents by age and residence.
4. Federal Government	4. Virtually all data available at the state level also is available from some agency of the federal government which will enable you to

Source	Indicator Information
	compare your local or state information on a regional or national basis. This is especially true for the Department of Health, Education, and Welfare.
a) U.S. Department of Commerce, Bureau of Census	a) Percentage of adults (age 25 years and older) with an eighth grade education or less; number of adults without a high school education (age 25 years and older); number of adults (age 25 and older) with 0-4 years of education; total number of persons below the poverty level.
5. Other Sources There is a wide variety of other sources of educational indicator data; these include, but are not limited to: professional organizations; business and commerce; state colleges and universities; etc.	
a) Professional Organizations (Council of Chief State School Officers, National Education Association, American Federation of Teachers, American Educational Research Association, state and local professional associations, etc.)	a) Reports of professional organizations on educational studies often reveal data which can prove relevant for educational indicators. These indicators cover the complete range of education programs and concerns of local school districts.

Source	Indicator Information
b) Business and Commerce (Insurance companies, oil companies, banks, utilities, etc.)	b) National business and commercial firms tend to conduct studies of interest to public education and also publish materials as a public service. The studies and materials of the following are most notable: Insurance Companies: Health and mortality information, especially medical and dental health and, more recently, information regarding alcohol and drug abuse. Oil Companies: Driver education, environmental education, and conservation materials and data. Banks: Materials and data on the value of money usually presented through some kind of junior banking program; national, regional, state, and local data in the form of consumer price index, cost of living index, and similar economic indicators. Utilities: Materials and data relevant to science and communication usually are made available to the public schools. Results of research similarly are presented through the medium of published reports or articles in professional journals.

Source	Indicator Information
c) State Colleges and Universities (especially their bureaus of educational, business, or commerce research)	c) Number of state high school graduates enrolled in freshman remedial courses in English and mathematics; student grades in college, by course; assessed valuation of property; expenditures of local government (including local schools); amount of personal income: tax, average income, average tax; population by various age ranges; number of children in families with various income levels: high, average, below poverty level; number of people living in urban or rural conditions; number of people by land area, density; number of business failures; number of dollars in payrolls, by industry.

As the reader readily can see from the sample listings, indicators covering a wide range of educational programs and purposes already are being collected by agencies at the local, county, state, and federal government levels as well as by other sources. A host of educational indicators are awaiting your use.

You might compare the *selection* of educational indicators to the use of audio-visual materials. Many audio-visuals already exist. But you must be selective in their use if they are to be effective in furthering instructional efforts. You must ask yourself, "What is the most efficient and effective way for our students to learn _____?" Let the nature of the educational objective dictate the teacher methodology and support materials (possibly audio-visual) to be used, not vice versa. And so it is when you look at the broad educational program goals and objectives for your school district.

In other words, you don't go to the Instructional Materials Center in your district, preview a film, and say, "For what

class can this film be used?" The same holds true for existing educational indicators for evaluation of local educational programs. To help you determine which indicators can be of viable use to you, ask yourself these questions:

- What are the crucial things our students must learn from the objectives of the ____grade_____program?

- What evidence do we need to say that our students have not only learned_____, but are practicing it in their behavior?

- What individual or series of indicator data are already being collected which could answer the question, "Have our students learned and are they practicing_____?"

When the last question has been answered, you probably have associated the appropriate indicators with the desired objectives to be evaluated.

How Do You Generate Educational Indicators?

For many educational program evaluations, educational indicators may already exist; but if your district is like most, there will be some crucial educational objectives for which no data are being gathered. There will come a time when all the existing indicators from local, county, state, federal, and other sources will not satisfy your district's needs. When this happens, you will find yourself in the educational research business.

After searching for already-existing educational indicators, you may find you either have a complete void or an incomplete number of indicators for one or more educational objectives. A statement of indicator requirements remaining unfilled then must be developed. Based upon the total statement of requirements, the district coordinator for indicators should list a series of alternate ways for gathering the needed information. These questions should be explored:

- Will student test results provide the necessary information?

- Are student, teacher, or parent questionnaires required?

- Do you need to measure the attitudes and opinions of a sampling of people in the community to solve your problem?

- Can you solicit a local, county, or state agency to get the required data?

- Can you use unavailable indicator data as the basis for a proposal for state or federal categorical funds to do research in uncovered areas?

When the district coordinator for indicators has answered these and other related questions, he or she will be in a position to move into the instrument development and data gathering phases of local educational research.

The *instrument development* phase of educational research is both a tedious and time-consuming exercise. (This is why it was recommended earlier in this chapter that the district coordinator for indicators should have a background in educational tests and measurements.) Initial decisions which must be made include:

- Who is to be sampled?

- What form shall the measuring instrument assume?

- Do you need to construct a questionnaire? If so, will the same version of the questionnaire be appropriate for each group of people to be sampled (e.g., students, teachers, parents, etc.)?

- Is the interview technique appropriate? If so, will an interview guide need to be developed so that each interviewer asks the same questions in sequence?

Regardless of whether questionnaires, interviews, or some other means of data collection are to be utilized, the next step for the district coordinator for indicators is to develop a set of *operational definitions*. In psychology and in education an operational definition defines the specific array of behaviors that describe the term being defined. For example, if you have an indicator in your study called *student adherence to democratic principles in everyday life*, it might be operationally defined as follows:

> A student will be said to be adhering to democratic principles in his everyday life if, and only if, he is: tolerant of another person's different ethnic background and values; accepts fellow students as equals regardless of their intellectual prowess; willingly accepts the majority decision even if it conflicts with his own; willing to do his share in

helping the family situation along; willing to treat co-workers as coequals on the job; and willing to accept responsibility for the consequences of his actions.

If the above were an operational definition for your district, the district coordinator for indicators would seek to provide information relevant to one or more of the phrases of the definition until all the phrases are adequately sampled in the data gathering processes. The coordinator then would have to ask, "Do I have enough items to measure this indicator?" and "When is enough really enough?" There are no exact rules for answering these questions because indicators will vary in complexity, but a good rule of thumb might be: not less than three nor more than five questions should relate to each phrase of an operational definition. Of course, depending upon the complexity of the indicator, you may wish to vary the rule of thumb.

If you are going to utilize questionnaires or interview guides, you may wish to try them on a small number of people before you actually gather your data on the full sample for your study. A pilot study will assist you in determining the *validity* and *reliability* of your questionnaire or interview guide. Validity and reliability are two characteristics of a good measuring instrument which will enable you to have trust in the data you will receive in the larger sampling for your study. *A test is valid if it measures what it is intended to measure and nothing else.*

In some cases the district coordinator for indicators will be primarily interested in content validity. In other words, do the responses made in the pilot study tell you all you need to know about what it is you're trying to measure? Your coordinator may find that everyone in the pilot study answers one or more questions exactly the same way. When this occurs it may be decided to accept this information and eliminate these particular questions from the larger sampling.

Reliability has to do with consistent results. In this regard your district coordinator for indicators may wish to exercise an option. It is possible to statistically tabulate a *reliability coefficient* based upon internal consistency OR it is possible to include the pilot study sample in the major sampling and correlate the pilot study and "real study" results. One of the options should be utilized. (Remember it was noted that the district coordinator for indicators should have experience in psychological and educational statistics? You can see the need for these competencies.)

After the pilot study comes the major study. Tools of the study must be readied, distributed, completed, returned; then the district coordinator for indicators must tally the results. The coordinator may wish to aggregate the results by computing the mean (arithmetic average) for each aspect of the data obtained. When this is done, you have an educational indicator based on data not available from other sources. Sound easy? It can be time consuming, but it's not really terribly difficult.

Summary

In this chapter it has been suggested that a district coordinator for indicators be named. It also was suggested that school building contact persons and an advisory committee be called upon to assist the district coordinator. A sampling of already-available educational indicators was provided and, while it is not a complete list, it should activate the reader's imagination to the point of asking, "Where are indicators already available in my school district, county, state, federal agencies, and elsewhere?" Some elementary procedures also were suggested for generating your own educational indicator data. Now...what do you do with the educational indicator data after you get it?

CHAPTER IV

HOW DO YOU GROUP EDUCATIONAL INDICATOR DATA?

The process of grouping educational indicator data is a relatively easy, mechanical operation. Nonetheless it is crucial that the process be performed and be performed correctly.

Prioritizing Objectives and Indicators

A priority rating should be assigned to each educational objective which is to be evaluated in a given educational program. Of course some objectives are more crucial than others. Therefore educational objectives may be classified as *very important, important,* and *nice to know.* Educational objectives also can be classified as discriminative or growth. A *discriminative objective* is one which the bright students will learn well, while the less intellectually endowed students might not learn it as well. Test items on achievement tests that purport to measure comprehensive applications or extensions of basic principles usually are assessing discriminative objectives. On the other hand, *growth objectives* are those objectives written against the major building blocks of a course or against the learning concepts which are required for further learning in the course. It is desirable that all or virtually all students (say 80%) achieve growth objectives.

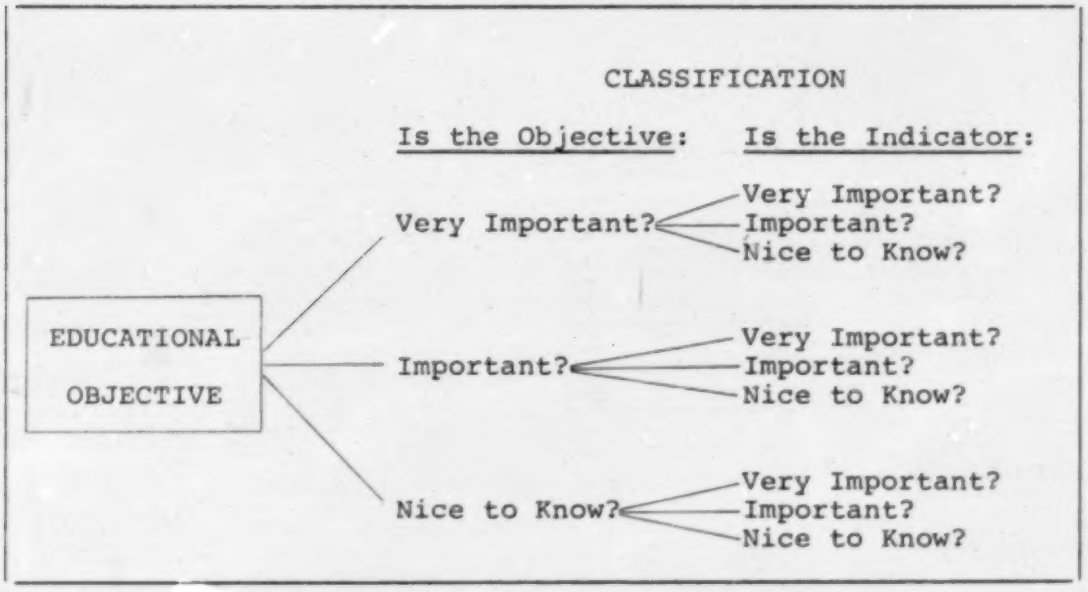
To begin the prioritizing process, first you classify your objectives as discriminative or growth. Second, you make a decision as to whether each objective is very important, important, or nice to know. At this point you are ready to prioritize your educational indicators that you have related to each educational objective. Similarly, educational indicators identified as being relevant to a given educational objective also can be classified as very important, important, or nice to know.

When you have classified the priority of all the educational indicators for each educational objective, you then

can see the degree to which each indicator or set of indicators should yield valid results. This relationship is shown in Figure 1:

FIGURE 1

DIAGRAM OF OBJECTIVES AND
EDUCATIONAL INDICATORS CLASSIFICATION



As Figure 1 suggests, each educational objective should be classified and then, in turn, each educational indicator should be classified and related to the objective. When all educational indicators for a given objective have been classified according to importance (assuming more than one indicator per objective), the district coordinator for indicators then can assign a priority to the data the combined indicators should yield. This process results in the prioritizing of objectives and their corresponding educational indicators.

Another way of illustrating the combination of classifying and prioritizing is to present various hypothetical educational objectives and indicator classifications for given objectives, and then indicate the confidence a district coordinator for indicators should have in the resulting data.

Let's assume for a given objective that three educational indicators have been identified. The range of objective and indicator classifications, together with the district coordinator's decision concerning confidence in a hypothetical example, are contained in Figure 2:

FIGURE 2

COMBINATION OF WAYS OF CLASSIFYING OBJECTIVES AND INDICATORS AND THE CONFIDENCE ASSIGNED TO EACH COMBINATION

If the objective is classified as:	AND	If the indicators (3) are classified as:	The district coordinator for indicators should place this amount of CONFIDENCE in the data that will emerge:
Very Important		Very Important (3) Important (0) Nice to Know (0)	Very High Confidence
		Very Important (2) Important (1) Nice to Know (0)	High Confidence
		Very Important (1) Important (2) Nice to Know (0)	Confidence
		Very Important (1) Important (1) Nice to Know (1)	Confidence
		Very Important (0) Important (3) Nice to Know (0)	Tentative Confidence
		Very Important (0) Important (2) Nice to Know (1)	Tentative Confidence

Figure 2 Continued

If the objective is classified as: AND	If the indicators (3) are classified as:	The district coordinator for indicators should place this amount of CONFIDENCE in the data that will emerge:
Very Important Cont.	Very Important (0) Important (1) Nice to Know (2)	No Confidence
	Very Important (0) Important (0) Nice to Know (3)	No Confidence
Important	Very Important (3) Important (0) Nice to Know (0)	Very High Confidence
	Very Important (2) Important (1) Nice to Know (0)	Very High Confidence
	Very Important (1) Important (2) Nice to Know (0)	High Confidence
	Very Important (1) Important (1) Nice to Know (1)	High Confidence
	Very Important (0) Important (3) Nice to Know (0)	High Confidence
	Very Important (0) Important (2) Nice to Know (1)	Confidence

Figure 2 Continued

If the objective is classified as:	AND	If the indicators (3) are classified as:	The district coordinator for indicators should place this amount of CONFIDENCE in the data that will emerge:
Important Cont.		Very Important (0) Important (1) Nice to Know (2)	Tentative Confidence
		Very Important (0) Important (0) Nice to Know (3)	No Confidence
Nice to Know		Very Important (3) Important (0) Nice to Know (0)	Very High Confidence
		Very Important (2) Important (1) Nice to Know (0)	Very High Confidence
		Very Important (1) Important (2) Nice to Know (0)	Very High Confidence
		Very Important (1) Important (1) Nice to Know (1)	Very High Confidence
		Very Important (0) Important (3) Nice to Know (0)	High Confidence
		Very Important (0) Important (2) Nice to Know (1)	High Confidence

Figure 2 Continued

If the objective is classified as:	AND	If the indicators (3) are classified as:	The district coordinator for indicators should place this amount of CONFIDENCE in the data that will emerge:
Nice to Know Cont.		Very Important (0) Important (1) Nice to Know (2)	High Confidence
		Very Important (0) Important (0) Nice to Know (3)	High Confidence

It is readily apparent that prioritizing has to do with placing a value on something. The third column of Figure 2 suggests a series of confidence levels which a district coordinator for indicators might assign on the basis of indicator data.

The district coordinator for indicators also will want to establish some *criterion standards of success* for each indicator to be used. In other words, how large must the magnitude of a given educational indicator be for the coordinator to say, "Yes, this indicator says we're making it," or "No, this indicator says we've got problems"?

It should be noted there is no particular rule of thumb for establishing criterion standards of success. The district coordinator for indicators will have to establish cutoff points on the educational indicator scale and define a meaning for each point identified. Note, however, that it is crucial to set criterion standards of success for each indicator BEFORE the magnitude of the indicator is known.

For example, let's say you're evaluating a math program. A test is being administered to a class in October. The test yields three math scores you will use as educational indicators:

math facts, math processes, and computational skill. Based on the October test, the grade placement to be expected for the average child will be 5.1 (this method of averaging will be explained in greater detail in Chapter V). Your district coordinator for indicators may establish the following standards for each of the three scores:

Average Student Achievement	Criterion Interpretation
4.8 or less	Our program needs improvement
4.9 - 5.3	Our program is "making it"
5.4 or more	Our program is exemplary

Again it must be emphasized that setting criterion standards of success and their corresponding interpretations must occur *before* the educational indicator is measured. Then when the educational indicator measurement has been made, the magnitude which results already has a meaning for interpretation.

Summary

This chapter has suggested ways in which the district coordinator for indicators can sort out the indicators that go with each educational objective being evaluated. Both educational objectives and educational indicators should be classified as very important, important, or nice to know. When the coordinator "lays out" the classified objectives and the classified indicators, some judgment can be made about the confidence the indicator information should offer. It also has been suggested that, while going through the classification process, the coordinator should establish cutoff points along each indicator. These cutoff points then are assigned interpretations. The latter process usually is referred to as establishing criterion standards. The crucial aspect of everything presented in this chapter is that the whole process of classifying and prioritizing must occur before the educational indicators are quantified.

At this point you've discovered indicators...found out something about the kinds of indicators which exist...classified indicators...grouped and related them to educational objectives. Your next question may well be, "So what?"

CHAPTER V

HOW DO YOU INTERPRET INDICATOR INFORMATION?

Evaluation

Educational evaluation is judgment based on criteria. This classic definition has withstood the test of more than a half-century of use in the field of public education. Educational evaluation is a terminal activity associated with educational measurement or assessment. Evaluation seeks to answer the question, "So what?" regarding data.

Measurement is the art of quantifying something. The purpose of educational measurement is to assess whether the student has attained (learned) the various objectives of the curricula. For all practical purposes in education, the words *measurement* and *assessment* are synonymous. (The largest organization dedicated to assessment, National Assessment of Educational Progress or NAEP, tends to reaffirm this relationship between measurement and assessment. NAEP reports merely present the data that have been gathered; they make no specific recommendations as to how learning deficiencies should be ameliorated.)

On the other hand, when you evaluate a given program and find components lacking, it is a natural tendency to seek alternate strategies to correct problems. So it should be with educational indicators. If you're not willing to try to improve your educational programs by suggesting alternatives to problems, then you should forget the whole assessment or measurement process. You're wasting your time and other people's money when you do not follow through. If you're not willing to face reality and be agents for educational change when change is warranted, then don't collect educational indicator data. It will only embarrass you and make you feel uneasy.

Now, for those of you who are still reading and have decided to evaluate educational indicators--welcome. Educational evaluation can be both interesting and intriguing (although when you are identified as an evaluator, some educators tend to treat you as if you have an infectious disease).

The New York and Pennsylvania programs described earlier treat indicators from a local school district evaluative frame of reference. Oregon, while a leader in the educational indicators arena, has chosen to operate at the assessment level only.

Evaluation Climate

If you're wise, you will lay a foundation of mutual trust and regard before you expect to be able to function at the evaluation level with educational programs. People are people. People can do and *do* do some funny things. You also should remember that administrators and teachers are people too. They feel, and have a right to feel, that the educational programs they administer carry the skill and imagination which they have built into the art of teaching. Then you come along and say, "We can do this better." It is essential that you make such a suggestion in an objective and emotionally neutral way.

Educators tend to react in similar manner to managers in industry when confronted with evaluation. Some managers are delighted to have another person come in and take a fresh look at the operation they are charged with. These same managers tend to be open to suggestions for change and do not necessarily feel threatened by the idea that the job could be accomplished in a better way. Other managers are inclined to regard evaluation in poker player terms--with "cards close to the vest." The latter managers seem to resist any suggestions for change since they feel that, if they admit the job could be done better, they also are admitting they're really not good administrators. Unfortunately, some highly talented people still regard their station in life as tentative and precarious. In a school district of any size, you are going to have to deal with administrators and teachers who run the entire gamut of the security-insecurity continuum.

How do you establish an objective evaluative environment at the local school district level? Perhaps the first thing you should do is meet with the superintendent and request the board of education to issue a policy statement on educational evaluation. The exact wording will vary from district to district, but the policy statement should contain the following thoughts:

- The members of the school board and the administration of _____district are committed to quality education for our children.

- The members of the school board feel they are very fortunate to have secured the services of truly outstanding and innovative educators for both the administrative and teaching staffs.

- In an attempt to continually increase the quality of the educational program offerings in the district, a rigorous evaluation of each program will be undertaken in a three-year cycle.

- Programs will be evaluated during the first year of the three-year cycle, and suggested improvements will be documented.

- During the second year of the cycle the programs will be modified to include suggested improvements.

- During the third year of the three-year cycle the modified curriculum will be operational in the classroom.

- During the fourth year (first year of a new three-year cycle) the educational program will be evaluated again.

- It is the intention of the members of the school board and the superintendent that the educational resources of both the administrative and teaching staffs will be fully utilized to modify our curriculum.

- To lend support to this policy of quality education for all our school children, the board is earmarking $_____to defray the expense of ____ evaluators, ____ curriculum specialists, and $_____ for substitute teachers and administrators in order to release our personnel to work on curriculum revisions.

Such a policy statement would tend to create a non-threatening atmosphere in the school district, provide a climate for objective evaluation, and demonstrate that the board of education truly is "behind the evaluation program." In such an atmosphere, the evaluators might even find some teacher or administrator who would, in a friendly way, offer to buy them a cup of coffee.

Interpretation of Results

The district coordinator for educational indicators will find that indicator data can be treated like any other data

for reporting purposes. The nature of the educational indicator data will similarly be of the *nominal*, *ordinal*, and *interval* variety. The coordinator will tend to use the same statistical routines on educational indicator data that would be used for routine educational data.

Some readers may not be familiar with educational statistics. While it is not the intent of this monograph to deal with statistics, some mention needs to be made concerning norm-referenced and criterion-referenced testing. A *norm-referenced test* is developed by a commercial testing company and has national norms. When a student takes this type of test, his achievement can be compared with equivalent students on either a national or regional basis. A *criterion-referenced test* is a locally produced test designed to measure the student mastery of learning objectives contained in a given school district's program. Criterion-referenced tests also are available commercially. These test items, together with statements of the educational objectives they are designed to measure, can be purchased by local school districts. If the commercially available criterion-referenced objectives are identical to the local school district's objectives, the test can be administered as purchased. When the district and commercial criterion-referenced objectives are *not* in consonance, the criterion test writing task must rest with the local school district.

(Up to this point in the monograph, the author has stressed the importance of relating indicators to objectives of school programs. This emphasis might tend to put the author in the criterion-referenced testing camp. I don't mind. I actually have friends who are criterion-referenced testing protagonists.)

A point should be made, however, that the comparison of data yielded from each measurement device (norm vs. criterion) need not necessarily result in an *either-or* type of measurement decision. Certainly a given norm-referenced instrument does not contain items which comprehensively measure the content of a particular district's English, math, reading, or social studies programs, but chances are that it does measure a significant portion of these respective programs (or else why did the faculty recommend the use of a given norm-referenced test??). The questions on the norm-referenced test can be compared to the school district's program objectives; when this is done, some local objectives may be reflected by five or more questions, others by one or two questions, and still others will have no related questions on the norm-referenced instrument. Such an analysis will

thus reveal objectives which have been partially measured and others that have not been measured at all. This analysis then becomes the basis for constructing a criterion-referenced instrument.

Now, at testing time, both instruments are administered. The usual norm data are available for use in the traditional manner for each student. Similarly the student answers for both instruments are grouped by local school district educational objectives to ascertain whether or not the obtained ease indices (percentage of students who answer a test item correctly) meet the established criteria. This dual approach enables local educators to conduct their district-wide assessment and relate both types of data to the effectiveness of their local educational programs.

Many school districts which employ norm-referenced measurement also purport to have programs which individualize instruction. Certain *individualized programs* such as Individually Prescribed Instruction (IPI), Individually Guided Education (IGE), Project PLAN, etc. each have the notion of individual student learning as their goals. With such programs, norm-referenced tests can be employed to determine whether a given student is working up to his or her potential through comparison of actual achievement with some measure of expected achievement.

In the early 1960s the California Testing Bureau (now a division of McGraw-Hill) incorporated an *intellectual status index* into the California Achievement Test Battery. The intellectual status index employed the mental age portion of the student's I.Q. to project how much progress a given child should make in a school year. The technical conversion grade equivalent measures for each I.Q. then are made. The practice was to compare *actual achievement* with *expected achievement* and determine whether the student was an *underachiever*, *achiever*, or *overachiever* on a given subtest. One problem experienced when using the intellectual status index was that this technique tended to overestimate a given student's predicted achievement.

In 1969 Myklebust developed a *learning quotient* (L.Q.) which is said to be a more reliable estimate of expected performance.[2] The learning quotient includes a more definitive

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[2]H. E. Myklebust, editor, *Progress in Learning Disabilities*, Vol. I (New York, Greene Stratton, 1969).

and comprehensive index of expectancy as it takes into account not only the mental age but also the chronological age, representing physiological maturity, and the grade age, representing an index of school experience. A learning quotient can be computed for each area of achievement (each subtest), thus providing individualistic information for each child.

Actual achievement (scores earned on achievement tests) then is related to this expectancy and multiplied by 100, resulting in a learning quotient:

$$\frac{\text{Achievement Age} \times 100}{\text{Expectancy Age}} = \text{Learning Quotient}$$

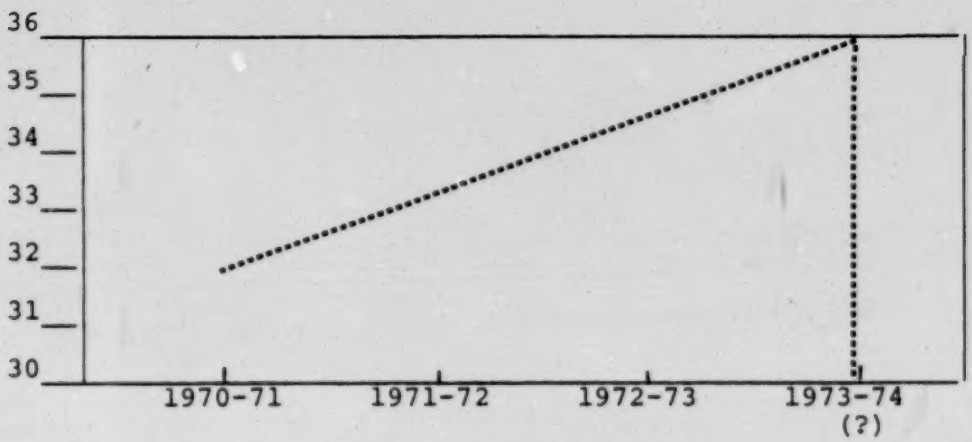
Learning quotients of 89 and below are interpreted to represent substantial discrepancy between actual and expected achievement, indicating a student learning deficiency requiring special attention. Learning quotients of roughly 90 to 93 represent problem areas still requiring attention but not quite as severe as the 89 and below L.Q.s. Learning quotients of roughly 94 and above indicate that a child is achieving at a level commensurate with his expectancy. A relative pattern of strengths and weaknesses becomes apparent as L.Q.s in different achievement areas are compared.

Whether the local district employs a combination of norm and criterion-referenced data to assess their educational programs on a local basis or embarks on a computerized approach to measure the individualized learning of its students, the results come out the same. Areas of program strengths and areas of improvement result. It remains for the educational leaders in the district to evaluate these data and initiate programs of change, where appropriate.

Prediction or Expectancy

The educational indicators you use in evaluating your educational program might be used to *predict* the future level of some component of the school district's program. For example, let's say that a medium-sized school district (enrollment 36,000+) is located in close proximity to a large military installation. The city is listed as one of the top ten fastest growing communities in the United States. Let's say that the 1970-71 enrollment was 31,809; the 1971-72 enrollment was 33,124; the 1972-73 enrollment was 34,467. What should be the enrollment for the 1973-74 school year? The data are shown in Table I:

TABLE I
PREDICTING STUDENT ENROLLMENT



By connecting the 1970-71, 1971-72, and 1972-73 enrollment data, a straight line (or line of best fit) is obtained. By extending the line until it intersects a vertical line extending upward from the 1973-74 location on the horizontal axis, the intersection is slightly higher than 36,000 students.

But (to continue our example) when school started in September, 1973, there were only 35,200 children enrolled. Where are the other 800 students? Well, during the 1972-73 school year, the Department of Defense personnel budget was reduced, and the local military installation was cut 380 manpower positions for the new fiscal year (beginning July 1). The military commander decided to take his personnel reduction through normal attrition (not getting replacements for 380 personnel whose tour of duty or enlistment would terminate by June 30). If the school planners did not take this additional information into account (@2.1 children/family), the September enrollment was overestimated by 800 students. If the cost/student expenditure in that district was $900/student, this error would have amounted to $720,000 in the budget. Also on the pupil-teacher ratio of 24:1, an additional 33 teachers would have been hired. If the average cost/teacher was $10,300, then $339,900 would have been spent unnecessarily on teachers whose services really were not needed. To compound the felony, the school district would receive less state aid than it had anticipated. Also, the Public Law 874 funds would be decreased.

The point being made in this illustration is that you not only must be sensitive to educational indicators, but also must

be "on top of" any other factors which could influence educational predictions. School budgets are built on educational indicator data, but the planner must be willing to make adjustments whenever some influencing factor varies.

Based on student input factors for each class, every class of students *becomes a rather unique entity.* The students' academic potential can be predicted. When actual performance is less than expected, the logical question is, "What happened?" Educational indicator information often can help to interpret the basic achievement data in terms of the "What happened?" query.

Many tests are scored on the basis of a grade equivalent score. *Grade equivalent scores* divide the year into ten months so that 5.0 refers to September in the fifth grade, 5.1 is October in the fifth grade, and so forth. When using tests that report results in grade equivalent scores, it is essential that the obtained results be compared to the actual month in which the test was administered. An average grade equivalent score of 5.5 for a test administered in February places the local student achievement right on the national norm. To interpret this score, the district coordinator for indicators would have to see if the students who took the test in question were within the normal range of intelligence (90-110). If they are, the district coordinator may say, "Our students are progressing well in terms of other similar fifth grade students in the nation." If the average I.Q. of the students who took the test was 95, the district coordinator can say, "Our students are exceeding the performance of similar fifth grade students in the nation." If the average I.Q. of the students who took the test was 112, the district coordinator would have to say, "Our students are not achieving as well as similar fifth grade students across the nation. We need to look closely at what our students are learning."

Oregon is using a format for building a matrix showing the direct relationship between goals, concepts, and appropriate indicators. Oregon has adopted goals for education in the state which are related to six life roles. These are learner, producer, citizen, consumer, individual, and family member. This matrix format is shown in Table II.

A district coordinator for indicators might find it handy to add one or two columns to the Oregon matrix. In these additional columns could be placed the indicator values and the year these data were gathered. This would be helpful especially for planning and for interpretation of results.

One last point. Earlier in the monograph the statement was made that indicators should have at least one of four purposes for being used. Those four purposes bear repeating. Indicators should tell you:

1. How are our students doing in school?

2. How do our students fare after they leave school?

3. How can this information be of assistance to the instructional staff?

4. Are we getting as much as we should for our school dollar?

As you relate educational indicator data to educational objectives, keep these four questions in mind. Your interpretation of indicator data will be better utilized if it is related to these four major purposes.

TABLE II
SUGGESTED INDICATORS FOR SELECTED CONCEPTS
IN PROPOSED STATE GOALS (OREGON)[3]

Goal	Concept	Performance Indicator	Societal Indicator
Producer	Making appropriate career choices	Number of students enrolled in special career awareness or career exploration programs in Oregon. Source: *Annual Summary of Exemplary Projects in Vocational Education*, State Department of Education	Population 16-21 not in school, unemployed, and not in the labor force. Source: *Annual Report, CAMPS Manpower Data*, Governor's Commission on Manpower
Consumer	Management of personal resources	Percent of students tested that are able to demonstrate ability to balance a checkbook. Source: Test item on statewide assessment of student performance in personal finance, State Department of Education.	Number of consumer problems handled by Legal Aid by types; sales contracts, garnishment, and bankruptcy. Source: *Community Service Project Annual Report*, Community Action Agency, Portland.

[3]Robert Clemmer, Dwight Fairbanks, Mary Hall, James Impara, and Charles Nelson, *Indicators and Statewide Assessment* (Denver: Cooperative Accountability Project, 1974), p. 5.

Summary

In Chapter V a case has been made for establishing a positive climate for evaluation at the school district level. Discussion also focused on forms of testing used to gather performance indicator data. Don't be forced into either the norm-referenced or criterion-referenced camps. Use the best parts of both, and apologize to no one. Some suggestions and cautions have been mentioned dealing with interpretations when attempting predictions. The Oregon matrix format has much to recommend it. Finally, the importance of interpreting indicator data in terms of four purpose questions again was stressed.

CHAPTER VI

DISSEMINATING EDUCATIONAL INDICATOR REPORTS

Reports generated by indicator evaluation must be written in different forms so that different target audiences can read and understand them. A technical report replete with statistical comparisons can be developed for educational researchers and key educational administrators. A "plain English" version of the report should be developed for parents, students, and the public so that laymen can read and react to the findings.

The outline for each version of an indicator evaluation report should follow the taxonomy (classification structure) for educational decision makers described in a monograph this author assisted in writing for the National Association of State Boards of Education entitled *Statewide Educational Evaluation.*[4]

Indicator evaluation data should provide partial answers to these questions:

1. What should our school graduates know; be able to do; believe? What do they now know?

2. To what extent should the schools ameliorate class differences; emphasize individual excellence; insist on common minimum standards of performance, treat the exceptional student exceptionally?

3. What do our citizens believe should be the goals of education; consider the essential priorities of education; feel about the value of student preferences and needs?

4. What should we do about the contradictions affecting education between freedom, progress, and

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[4]D. Tronsgard, M. Grady, and E. D. Coon, *Statewide Educational Evaluation* (Denver: National Association of State Boards of Education, 1974).

necessity; between goals of equality and goals of excellence; between what we believe and what we are doing; between societal and individual needs and preferences?

If indicator evaluation reports respond to this taxonomy of educational questions, the achievements, the successes, the areas for improvement, and the follow-up activities come quickly and sharply into focus. Indicator reports should provide the locus for innovation and improvement in public education, and these reports should allow the local board of education members to receive *hard data* so they can make more valid educational decisions for the future.

Using educational indicators for evaluative purposes will add a comprehensive dimension to your school program. The use of indicators can help to provide to teachers the opportunities to implement the new, innovative techniques they have been reading and learning about.

An underlying commandment should pervade the collection, interpretation, and reporting which emanates from the use of educational indicators. This commandment is:

Thou shalt not use educational indicators as an excuse to conduct a witch-hunt or to search for a scapegoat.

Getting along with one's neighbors is an exercise in human relations. So too is keeping faith and peace in the educational community. As you conduct your work in all phases dealing with educational indicators, treat other people professionally, and they'll treat you that way too.

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C A P PUBLICATIONS

Report Number

1 *Annotated Bibliography of the State Educational Accountability Repository.* Phyllis Hawthorne. Revised April 1974. Wisconsin.

2 *Legislation by the States: Accountability and Assessment in Education.* Phyllis Hawthorne. Revised August 1974. Wisconsin.

4 *State Goals for Elementary and Secondary Education.* Susan Ketchum Ribble. Revised September 1973. Wisconsin. ERIC ED 083747.

5 *Characteristics of and Proposed Models for State Accountability Legislation.* Phyllis Hawthorne and Archie A. Buchmiller. April 1973. Wisconsin. ERIC ED 078 514

6 *Accountability: A Bibliography.* Gordon P. Hanson. July 1973. Wisconsin. ERIC ED 084630.

20 *Keeping the Public Informed: Accent on Accountability.* A digest of the Michigan dissemination model. Erwin P. Bettinghaus and Gerald R. Miller. 1973. Michigan.

21 *A Dissemination System for State Accountability Programs.* Erwin P. Bettinghaus and Gerald R. Miller. June 1973. Michigan.

22 *Developing a Large Scale Assessment Program.* Frank B. Womer. July 1973. Minnesota.

23 *Indicators and Statewide Assessment.* March 1974. Oregon.

24 *Roles of the Participants in Educational Accountability.* Carl E. Wilsey and Glenn B. Schroeder. 1974. Colorado.

25 Using Educational Indicators for Program Accountability. Michael J. Grady, Jr. September 1974. Colorado.

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